CLAIMS

1. A method of converting a digital colour image having colour values to a digital colour image with improved colour distinction for an observer suffering from a type of colour-blindness, wherein the digital colour image with improved colour distinction is having converted colour values, the method comprising the steps of:

defining a number of main colour values of the digital colour image;

converting the main colour values to converted main colour values such that the converted main colour values are perceived as distinguishable from each other by said observer; and

rendering the digital colour image with the converted main colour values.

2. The method of converting a digital colour image according to claim 1, further comprising the step of:

determining the type of the colour-blindness of said observer.

3. The method of converting a digital colour image according to claim 1, wherein in the defining step, the main colour values are determined by a cluster analysis of the colours of the digital colour image, a main colour value being a representative of the colour values in a cluster.

4. The method of converting a digital colour image according to claim 3, wherein the colour values in a cluster are converted to converted cluster colour values.

5. The method of converting a digital colour image according to claim 1, wherein a distribution of the main colour values with respect to confusion lines in at least a part of a colour space is taken into consideration for converting the main colour values, each of said confusion lines comprising colour values which are perceived as indistinguishable from each other by an observer suffering from a type of colour-blindness.

6. The method of converting a digital colour image according to claim 5, wherein the distribution of the converted main colour values with respect to the confusion lines is such that no more than one converted main colour value is allocated on a confusion line.

7. The method of converting a digital colour image according to claim 5, wherein the conversion of the main colour values is performed according to a conversion function which allocates to an angle formed between a reference confusion line and a line connecting a main colour value to a confusion point, the confusion point being a point where the confusion lines intersect, a converted angle being the angle between the reference confusion line and a line connecting the corresponding converted main colour value to the confusion point.

8. The method of converting a digital colour image according to claim 7, wherein the original angle sequence of the main colour values is maintained for the converted main colour values.

9. The method of converting a digital colour image according to claim 7, wherein the conversion function is dependent on an image type recognized by analysing the distribution of the main colour values.

10. The method of converting a digital colour image according to claim 7, wherein the conversion function allocates a weight to each main colour value, depending on the number of colour points present in the cluster having said main colour value as representative, the weight determining the type of conversion applied to each main colour value.

11. The method of converting a digital colour image according to claim 1, wherein a lightness of the converted main colour values is such that the contrast between the converted main colour values is optimized for said observer.

12. An apparatus for converting a digital colour image having colour values to a digital colour image with improved colour distinction for an observer suffering from a type of colour-blindness, wherein the digital colour image with improved colour distinction is having converted colour values, the apparatus comprising:

a memory for storing a digital colour image; and

a processing unit for processing the digital colour image, the processing unit including,

a cluster module for determining main colour values of the digital colour image by using a cluster analysis of the colours values in a colour space, and

a conversion module for converting, by a conversion function, the main colour values to converted main colour values such that the converted main colour values are perceived as distinguishable from each other by said observer.

13. The apparatus for converting a digital colour image according to claim 12, further comprising:

an analysis module for determining the type of the colour-blindness of said observer.

14. The apparatus for converting a digital colour image according to claim 12, further comprising:

a colour mapping module for establishing a position in a part of the colour space of the main colour values and of converted main colour values with respect to confusion lines.

15. An apparatus for converting a digital colour image having colour values to a digital colour image with improved colour distinction for an observer suffering from a type of colour-blindness, the apparatus comprising:

means for defining a number of main colour values of a digital colour image;

means for converting the main colour values to converted main colour values such that the converted main colour values are perceived as distinguishable from each other by said observer; and

means for rendering the digital colour image with the converted main colour values.

16. A computer program product embodied on at least one computer-readable medium, for converting a digital colour image having colour values to a digital colour image with improved colour distinction for an observer suffering from a type of colour-blindness, the product comprising computer-executable instructions for:

defining a number of main colour values of a digital colour image;

converting the main colour values to converted main colour values such that the converted main colour values are perceived as distinguishable from each other by said observer; and

rendering the digital colour image with the converted main colour values.

17. The computer program product according to claim 16, further comprising computer-executable instructions for:

determining the type of the colour-blindness of said observer.

18. The computer program product according to claim 16, wherein the main colour values are determined by a cluster analysis of the colours of the digital colour image, a main colour value being a representative of the colour values in a cluster.

19. The computer program product according to claim 16, wherein a distribution of the main colour values with respect to confusion lines in at least a part of a colour space is taken into consideration for converting the main colour values, each of said confusion lines comprising colour values which are perceived as indistinguishable from each other by said observer.

20. The computer program product according to claim 19, wherein the distribution of the converted main colour values with respect to the confusion lines is such that no more than one converted main colour value is allocated on a confusion line.

21. The computer program product according to claim 19, wherein the conversion of the main colour values is performed according to a conversion function which allocates to an angle formed between a reference confusion line and a line connecting a main colour value to a confusion point, the confusion point being a point where the confusion lines intersect, a converted angle being the angle between the reference confusion line and a line connecting the corresponding converted main colour value to the confusion point.

22. The computer program product according to claim 19, wherein the conversion function is dependent on an image type recognized by analysing the distribution of the main colour values.

23. The computer program product according to claim 19, wherein the conversion function allocates a weight to each main colour value, depending on the number of colour points present in the cluster having said main colour value as representative, the weight determining the type of conversion applied to each main colour value.

24. A printer provided with a network connection unit for receiving externally generated print orders, a processing unit for processing digital image data and a printing unit, wherein the processing unit is provided with an apparatus for converting a digital colour image for an observer suffering from a type of colour-blindness, the apparatus comprising:

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a memory for storing a digital colour image; and

a processing unit for processing the digital colour image, the processing unit including,

a cluster module for determining main colour values of the digital colour image by using a cluster analysis of the colours values in a colour space, and

a conversion module for converting, by a conversion function, the main colour values to converted main colour values such that the converted main colour values are perceived as distinguishable from each other by said observer.

25. An image display device provided with a display screen, and a processing unit for processing digital image data, wherein the processing unit is provided with an apparatus for converting a digital colour image for an observer suffering from a type of colour-blindness, the apparatus comprising:

a memory for storing a digital colour image; and

a processing unit for processing the digital colour image, the processing unit including,

a cluster module for determining main colour values of the digital colour image by using a cluster analysis of the colours values in a colour space, and

a conversion module for converting, by a conversion function, the main colour values to converted main colour values such that the converted main colour values are perceived as distinguishable from each other by said observer.